

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re: Application Ser. No.  
10/694,960

Filed: October 28, 2003

Applicants: Laye et al.

Title: PROCESS CHEESE  
CONTAINING INCREASED  
LEVELS OF WHEY  
PROTEIN

Art Unit: 1761

Examiner: Leslie A. Wong

Attorney Docket No.: 79708

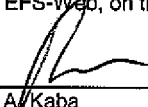
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**RESPONSE**

Sir:

This paper is in response to the final Office Action mailed March 7, 2006.  
Reconsideration is respectfully requested in view of the following remarks.

**The Claim Listing** begins on page 2 of this paper. New claims 27-32 have  
been added.

**Remarks/Arguments** begin on page 4 of this paper.

### **Amendments to Claims**

This listing of claims will replace all prior versions and listings of claims in the application. Please add new claims 27-32.

1. (Original) A process cheese comprising casein and whey protein with a ratio of casein to whey protein of from about 50:50 to about 75:25, wherein the process cheese has a penetrometer firmness of about 10 to about 20 mm and a melting point of about 105 to about 150°F.
2. (Original) The process cheese of claim 1, further comprising an emulsifier, milkfat, and one or more ingredients selected from whole whey, cheese, and lactic acid.
3. (Original) The process cheese of claim 1, wherein the ratio of casein to whey protein in the process cheese is from about 60:40 to about 75:25.
4. (Original) The process cheese of claim 1, wherein the ratio of casein to whey protein is from about 60:40 to about 70:30.
5. (Original) The process cheese of claim 1, comprising about 15 to about 35 percent cheese, about 10 to about 20 percent added fat, about 2.75 to about 3.25 percent emulsifier, about 5 to about 20 percent milk protein concentrate, and about 10 to about 20 percent whey protein concentrate.
6. (Original) The process cheese of claim 1, comprising about 15 to about 25 percent added fat, about 2.75 to about 3.25 percent emulsifier, about 0.5 to about 1.0 percent lactic acid, about 5 to about 20 percent milk protein concentrate, and about 10 to about 20 percent whey protein concentrate.

7. (Original) The process cheese of claim 6, further comprising about 2 to about 10 percent whole whey.

8 - 26. (Cancelled)

27. (New) A process cheese comprising casein and whey protein and an emulsifier with a ratio of casein to whey protein of from about 50:50 to about 75:25, wherein the process cheese has a penetrometer firmness of about 10 to about 20 mm and a melting point of about 105 to about 150°F.

28. (New) The process cheese of claim 27, further comprising milkfat and one or more ingredients selected from whole whey, cheese, and lactic acid.

29. (New) The process cheese of claim 27, wherein the ratio of casein to whey protein in the process cheese is from about 60:40 to about 75:25.

30. (New) The process cheese of claim 27, wherein the ratio of casein to whey protein is from about 60:40 to about 70:30.

31. (New) The process cheese of claim 28, wherein the ratio of casein to whey protein in the process cheese is from about 60:40 to about 75:25.

32. (New) The process cheese of claim 28, wherein the ratio of casein to whey protein is from about 60:40 to about 70:30.

### **REMARKS**

New claims 27-32 have been added. New independent claim 27 is essentially original claim 1 to which "an emulsifier" has been added as required ingredient (see original claim 2). Dependent claims 26-32, which ultimately depend on new independent claim 27, find support in original claims 2-4. No new matter has been added. As discussed below, Applicants believe that original claims 1-7 distinguish over the single prior art reference cited by the Examiner. New claims 27-32 were added to even further distinguish over this reference.

### **Rejection Under 35 U.S.C. §103**

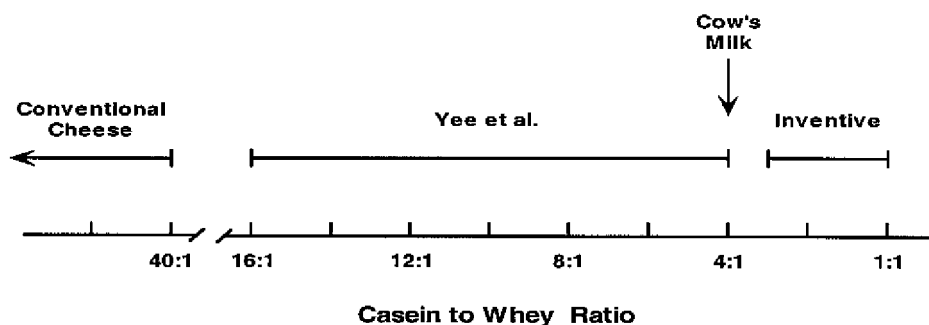
Claims 1-7 were rejected under 103(a) as being obvious over U.S. Patent No. 5,750,177 to Yee et al. Applicants respectfully request reconsideration of the above-identified application in light of the present remarks.

As noted in the present specification, Yee et al.<sup>1/</sup> describe natural cheeses with increased-whey protein having casein to whey ratios of 16:1 to 4:1 made from ultrafiltered cheese. The cheeses of Yee et al. require labor, time, and equipment-intensive ultrafiltered cheese, and result in cheese that has a casein to whey ratio that is no greater than that of the starting milk. Specification, page 2, lines 1-5. Yee et al. reports that cow's milk has a casein to whey ratio of about 40:1 and that conventional cheeses have a casein to whey ratio of about 150:1 to about 40:1 (col. 6, line 3-10).

In comparison, the present invention provides a casein to whey ratio of about 1:1 to about 3:1 (or 50:50 to 75:25 as expressed in claim 1). Applicants present below a graphic representation and comparisons of the various casein to whey ratios for conventional cheese (i.e., 150:1 to 40:1), the cheese of Yee et al. (i.e., 16:1 to 4:1), and the inventive cheese (i.e., 1:1 to 3:1); for completeness, the casein to whey ratio of a typical cow's milk is also included.

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<sup>1/</sup> It is important to note that the present specification presents casein to whey ratios whereas Yee et al. provides whey to casein ratios. Applicants have converted the whey to casein ratios of Yee et al. to casein to whey ratios in both the original specification and throughout the present remarks.



Thus, it is clear from this diagram that the cheese product of the present application has a significantly different ratio of casein to whey than does the cheese of Yee et al. or conventional cheese.<sup>2/</sup>

Moreover, it is clear from Yee et al. that they could not produce a cheese having a casein to whey ratio as provided by the present invention. The Yee et al. invention has two major aspects or features. First, Yee et al. "surprisingly found that by gradual heating and low shear agitation, natural cheese can be heated and blended without emulsifying agents." Col. 11, line 66 through col. 12, line 2. Second, Yee et al. found ultrafiltered cheese, alone or in combination with natural cheese, could be treated in this manner (i.e., gradual heating and low shear agitation) to apparently<sup>3/</sup> produce good melting cheese products with casein to whey ratio varying between about 16:1 to about 4:1 (as compared to about 150:1 to about 40:1 for conventional natural cheese). Col. 26, lines 6-11; col. 6, lines 5-10. To achieve this modification in the casein to whey ratio, Yee et al. used ultrafiltered

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<sup>2/</sup> In her rejection, the Examiner appears to dismiss Applicant's earlier arguments regarding ultrafiltered cheese by stating that "neither Yee et al. nor the claimed invention are specifically directed to ultrafiltration". That statement is incorrect. Yee et al. specifically uses ultrafiltered cheese to modify the casein to whey ratio of blends of natural cheese (casein to whey ratio of about 150:1 to about 40:1) and ultrafiltered cheese (casein to whey ratio of 4:1). Only using ultrafiltered cheese is Yee et al. able to make any modification of the casein to whey ratio.

<sup>3/</sup> It is noted (and discussed more fully below), that Yee et al.'s ultrafiltered cheese, when used without any additional natural cheese and treated in the manner described in Yee et al., generally did not produce a "good melting cheese" as that term is defined in Yee et al. (i.e., a melting temperature of less than 200°F). Such "good melting cheeses" were prepared using blends of natural cheese and ultrafiltered cheese in Yee et al.

cheese since all of the whey and casein in the original milk is retained, thereby forming an ultrafiltered cheese having a casein to whey ratio of 4:1.

The highest casein to whey ratios obtained by Yee et al. was 4:1 when ultrafiltered cheese was used without any added natural cheese. Addition of any natural cheese to the ultrafiltered cheese would, of course, reduce this ratio further since the natural cheese would have a casein to whey ratio of about 150:1 to about 40:1. Yee et al. was not able to go higher than 4:1 casein to whey ratio in any of the products they prepared.

The Examiner seems to be suggesting that since Yee et al. teaches the adjustment of the casein to whey ratio to at least 4:1 (or between 16:1 to 4:1), it would be obvious to adjust the ratio to **any value, including those provided by the present invention**. But as just demonstrated, the methods of Yee et al. were incapable of providing cheeses of such casein to whey ratio. The Examiner attempted to overcome these clear teachings of Yee et al. by simply stating that the "manipulation of the casein to whey ratio is well-known in the art." No further citations were provided to support the Examiner's assertion or characterization of the art in this manner. Yee et al. **did not**, and from the clear teachings in the reference itself **could not**, provide such cheeses having the casein to whey ratio of the present invention. A mere suggestion by the Examiner that it is "well known" in the art is not sufficient to maintain this rejection.

Moreover, the Examiner appears to be ignoring the requirement in the present claims that the melting point of the cheese having a "ratio of casein to whey protein of from about 50:50 to about 75:25" **must also have** "melting point of about 105 to about 150°F." As the Examiner has pointed out, Yee et al. provides natural cheeses with a "melting point of less 200°F." And, of course, the melting points required in the present claims clearly fall below 200°F. Nonetheless, Yee et al. clearly shows that as the amount of ultrafiltered cheese in their natural cheese/ultrafiltered cheese blends increases, the melting point also significantly increases. And of course, 100 percent ultrafiltered cheeses, which having a value of 4:1 casein to whey, most closely approach (but which still remain far from) the

casein to whey protein ratios of the present invention, have the highest melting points. Thus, one of ordinary skill in the art, if they even assumed that such cheeses having the casein to whey ratios of the present invention could be made, would have expected such cheeses to have even higher melting points, far from the melting points provided by the present invention and required by the present claims. See Yee et al., Tables 11-16.<sup>4/</sup> The lowest melting temperature reported for any 100% ultrafiltered cheese sample in Yee et al. was 166°F (Table 12)<sup>5/</sup>. The relevant data for Table 12 is reproduced below:

Natural Cheese/ UF Cheese Blend	Melting Temperature (°F)	Casein/Whey Ratio*
80/20	143	~81:1
60/40	149	~62:1
40/60	146	~42:1
20/80	165	~23:1
0/100	166	4:1

\* Casein/Whey ratios were estimated (except for the 0/100 blend) as a numerical average based on the relative amounts of the various cheeses in the blends using a casein/whey ratio for cheddar cheese of 100:1 (col. 6, lines 10-12) and a casein/whey ratio of the UF cheese as 4:1 (col. 26, lines 4-11) and assuming that the natural cheese and the UF cheese have roughly equal total amounts of casein + whey protein. Trends should remain similar even if the natural cheese and the UF cheese do not have equal total amounts of casein + whey protein.

The other tables of blends of natural cheese and ultrafiltered cheeses show similar trends. Thus, one of ordinary skill would expect, based on the teachings of Yee et al. that, even assuming cheeses having the casein to whey ratios of the present invention could be prepared, that they have even higher temperatures than the 4:1

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<sup>4/</sup> Yee et al. reports the following melting temperature for 100% ultrafiltered (i.e., casein to whey ratios of 4:1) cheese samples as follows: 170°F (Table 11), 166°F (Table 12), > 230°F (Table 13), >230°F (Table 14), 186°F (Table 15), and 180°F (Table 16).

<sup>5/</sup> Oddly, the ultrafiltered cheese used to make the blend was reported to have "Not melted at 230+°F" whereas the 100% ultrafiltered cheese blend (i.e., 0/100 blend) was reported to have a melting point of 166°F. Table 11 reports similar results. Whatever this inconsistency may mean, one of ordinary skill in the art would have still found similar trends (i.e., as the casein to whey ratio approaches the values in the present application, the melting point would be expected to increase).

casein/whey ratio ultrafiltered cheeses. Based on the teachings of Yee et al., one of ordinary skill in the art would have been surprised to find that it was possible, as provided by and claimed in the present invention, that process cheeses could be prepared having a casein to whey ratio of about 50:50 to about 75:25 as well as a "melting point of about 105 to about 150°F."

Clearly the present invention is not obvious in view of Yee et al. Applicants respectfully request that this rejection be withdrawn with respect to claims 1-7.

### **New Claims**

As noted above, new claims 27-32 have been added which specifically require emulsifiers. These claims are not obvious in view of Yee et al. for the same reasons as detailed above (which discussions is hereby incorporated by reference). Additionally, these claims are not obvious in view of Yee et al. since all of the cheese and cheese blends prepared by Yee et al. are specifically prepared without the use of emulsifiers.

### **CONCLUSION**

Applicants respectfully request that the Examiner allow pending claims 1-7 and new claims 27-32 and pass this Application to issue.

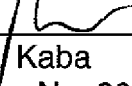
If the Examiner believes that a telephonic or personal interview would be helpful to terminate any issues which may remain in the prosecution of the Application, the Examiner is requested to telephone Applicants' attorney at the telephone number set forth below. The Commissioner is hereby authorized to charge any additional fees which may be required in the Application to Deposit Account No. 06-1135.



Application Serial No. 10/694,960  
Response to Office Action Dated March 7, 2006

Respectfully submitted,  
FITCH, EVEN, TABIN & FLANNERY

Date: March 24, 2006

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